

1. In a microprocessor having a plurality of physical registers, a method for managing said plurality of physical registers, said method comprising steps of:

providing a first structure for holding information identifying available physical registers that are free to be assigned as a destination operand for instructions executing on the microprocessor, said destination operand identifying where data resulting from an operation is to be stored;

storing a physical register assignment in a second structure noting that a selected one of the physical registers is assigned as a destination operand for a selected instruction executing on the microprocessor;

providing a third structure for holding information regarding available physical registers not utilized during execution of instructions;

transferring said physical register assignment of said selected physical register from said second structure to said third structure after retirement of said selected instruction; and

when said selected physical register is assigned as a destination operand for a subsequent instruction, transferring information identifying said physical register as available to said first structure.

2. The method as recited in claim 1 further comprising the step of storing mappings of logical registers to said plurality of physical registers.
3. The method as recited in claim 2 wherein the microprocessor is comprised of a memory array and wherein said method further comprises the step of storing said mappings to the memory array.

4. The method as recited in claim 1 wherein said microprocessor simultaneously executes multiple threads.

5. The methods as recited in claim 1 wherein contents of said first structure, second structure, and third structure of available registers are self-initialized to store the mappings of said physical registers.

6. The method as recited in claim 1 wherein contents of said assigned available physical registers are flushed from said assigned available physical registers.

7. The method as recited in claim 1 further comprising the step of detecting whether said assigned available physical registers are being utilized by said microprocessor for execution.

8. The method as recited in claim 1 wherein said method is performed by hardware.

9. The method as recited in claim 1 wherein said method is performed by software.

10. In a microprocessor having a plurality of physical registers a method for managing said plurality of physical registers, said method comprising steps of:

providing a first structure for holding information identifying available physical registers that are free to be assigned to a plurality of destination operands for instructions executing on the microprocessor, said plurality of destination operands identifying where data resulting from an operation is to be stored;

storing a physical register assignment in a second structure noting that a selected one of the physical registers is assigned to one of said plurality of destination operands for a selected instruction executing on the microprocessor;

5 providing a third structure for holding information regarding available physical registers not utilized during execution of instructions;

transferring said physical register assignment of said selected physical register from said second structure to said third structure after retirement of said selected instruction; and

10 when said selected physical register is assigned as a destination operand for a subsequent instruction, transferring information said selected physical register as available to said first structure.

15 11. The method as recited in claim 10 further comprising the step of storing a plurality of mappings of logical registers to said plurality of physical registers.

20 12. The method as recited in claim 11 wherein the microprocessor is comprised of a memory array and wherein said method further comprises the step of storing said mappings to the memory array.

25 13. The method as recited in claim 10 wherein said microprocessor simultaneously executes multiple threads.

14. The method as recited in claim 10 wherein contents of said first structure, second structure, and third structure of available registers are self-initialized to store the mappings of said physical registers.

30 15. The method as recited in claim 10 wherein contents of said assigned available physical registers are flushed from said assigned available physical registers.

16. The method as recited in claim 10 further comprising the step of detecting whether said assigned available physical registers are being utilized by said microprocessor for execution.

17. The method as recited in claim 10 wherein said method is performed by hardware.

18. The method as recited in claim 10 wherein said method is performed in software.

19. A microprocessor system with a plurality of physical registers for managing a plurality of physical register assignments comprising:

a first module for providing a first structure for holding information identifying available physical registers that are free to be assigned as a destination operand for instructions executing on the microprocessor, said destination operand identifying where data resulting from an operation is to be stored;

a second module for storing a physical register assignment in a second structure noting that a selected one of the physical registers is assigned as a destination operand for a selected instruction executing on the microprocessor;

a third module for providing a third structure for holding information regarding available physical registers not utilized during execution of instructions;

a first interface for transferring said physical register assignment of said selected physical register from said second structure to said third structure after retirement of said selected instruction; and

a second interface for, when said selected physical register is assigned as a destination operand for a subsequent instruction, transferring information identifying said selected physical register as available to said first structure.

20. The microprocessor as recited in claim 19 wherein said microprocessor simultaneously executes multiple threads.

21. In a microprocessor having a plurality of physical registers a method for managing said plurality of physical registers, said method comprising steps of:

providing a first structure for holding information identifying available physical registers that are free to be assigned to a plurality of destination operands for instructions executing on the microprocessor, said plurality of destination operands identifying where data resulting from an operation is to be stored;

providing a second structure for holding information regarding available physical registers not utilized during execution of instructions;

transferring said physical register assignment of said selected physical register from said first structure to said second structure after retirement of said selected instruction; and

when said selected physical register is assigned as a destination operand for a subsequent instruction, transferring information identifying said physical register as available to said first structure